PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application No.:	10/633,764
Filing Date:	August 4, 2003
Applicants:	Yihua Chang et al.
Group Art Unit:	1794
Examiner:	Michael C. Miggins
Title:	Membranes with Fluid Barrier Properties and Articles Containing Such Membranes
Docket No .:	4022-000009

Commissioner of Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Reply Brief Under 37 C.F.R. § 41.41

Sir:

This Reply Brief is filed in reply to the Examiner's Answer mailed November 25, 2008. This Brief is due on January 26, 2009, as January 25 falls on a Sunday.

Responsive Argument

Applicants concede that the Mueller teaching of diameter of from 50 to 1000 nanometers would at least suggest a particle width or height of 0.1 to 1.5 microns.

The Examiner's response fails, however, to rebut Applicants' argument that the combination of the Mueller and Bonk patents teaches away form including the Mueller modified clay particles if the person skilled in the art would wish to make a resilient membrane because one would expect the Mueller particles to make a film stiffer.

The Examiner states that column 6, lines 33-40 does not specifically state that the stiffness of the laminate is increased with added filler. This contention is misleading. What the Mueller patent states in this passage is, "The mechanical properties of materials for plastic packaging are physical properties that relate to the response (deformation) of the material under an applied stress. Some important mechanical properties are tensile strength, stiffness (flexural modulus), compressive strength, and impact resistance (toughness). Several standard ASTM tests for measuring mechanical properties of a material are listed below." Earlier, in the Summary of the Invention the patent states that its "invention relates to polymeric thermoplastic film structures having improved barrier and/or mechanical properties." After introducing the clay, the patent then teaches, "The amount of modified clay material combined with the polymer should be in an amount that is sufficient to provide the desired barrier and/or mechanical properties." Col. 4, ll. 1-3. The mechanical properties that are improved are those listed in the first quoted passage, col. 6, lines 33-40. Thus, the description says that mechanical properties are improved, and it is this passage in column 6 that characterizes stiffness as one of the four important—important!—mechanical properties the patent is referring to as improved. Again, in lines 41-46

that follow in column 6, Mueller states, "In the packaging industry, especially, the area of flexible films having one or more polymeric layers, there is a need to improve the barrier and/or mechanical properties of these films. It has been known to blend inorganic filler materials with a polymer material in film structures in order to achieve these improved properties." The Mueller patent teaches, and welcomes, increased film stiffness upon addition of its clay.

The Examiner insinuates that Mueller, by indicating embrittlement is to be avoided in the next line in column 6, is saying that increased stiffness should be avoided. Applicants submit this is not a reasonable, or logical, construction of that paragraph. First, nowhere does the Mueller patent teach or suggest that any increased stiffness results in embrittlement. In fact, stiffness is one of the important properties improved with adding the clay. What the Mueller patent actually says in lines 46-54, is, "However, this approach has not addressed the need completely as the inorganic filler may embrittle the structure and/or detract from its optical properties (such as haze and transparency). It has now been found that the incorporation of nanosize particles of a modified clay into one or more of the polymeric layers of said film structure can improve the barrier properties without sacrificing, and many times improving, the mechanical, optical and other properties and polymeric nature of the material." Again, this leads one to expect increased stiffness from addition the nanosize clay particles.

In view of these teaching, the skilled artisan would expect some increase in stiffness when the Mueller nanosize particles of clay are incorporated into a film. On the other hand, the Bonk patent strongly emphasizes the need for resiliency, which it equates (as do Applicants) to elasticity, for its membranes. For example, col. 1, lines 31-40: "While thermoplastic barrier films may be flexed to a certain extent due to their thinness, thermoplastic barrier films do not generally have sufficient elasticity for many applications. Elastic materials, or elastomers, are

able to substantially recover their original shape and size after removal of a deforming force, even when the part has undergone significant deformation. Elastomeric properties are important in many applications, including inflatable bladders for footwear and hydraulic accumulators."; col. 1, lines 56-49: "Many shoes, particularly athletic shoes, now include some type of resilient, shock-absorbent material or components to cushion the foot and body during strenuous athletic activity."; col. 3, lines 46-53: "Composites of different materials are particularly useful for footwear bladders because many requirements, sometimes contradictory, are made of the membranes used for footwear bladders. For instance, the membrane must exhibit excellent gas barrier properties as already mentioned toward both the inflationary gas and the ambient gases, while at the same time the membrane must be elastic and be resistant to fatigue failure."; col. 4, lines 56-58: We have now discovered that inflatable bladders with improved elastomeric properties and low gas transmission rates can be formed from microlayer polymeric composites."; col. 5, lines 22-26:"The microlayer polymeric composite material of the invention has rubber-like or elastomeric mechanical properties provided by the structural material that allows it to repeatedly and reliably absorb high forces during use without degradation or fatigue failure. It is particularly important in applications such as footwear and hydraulic accumulator for the membrane to have excellent stability in cyclic loading."; col. 6, lines 60-61 ("elastomeric membrane").

Given the paramount importance to Bonk of membrane resilience, the improvement of which is Bonk's whole reason for employing the microlayer polymeric composite structure, and given the Mueller patent's teaching that incorporating its clay into a film will increase stiffness, one would (in the words of the *Gurley* case quoted in our Appeal Brief) "be discouraged from

following the path set out in the reference," that is, discouraged from modifying the resilient Bonk membrane with a material expected to make the membrane stiff.

The Examiner argues that only Mueller example 18 mentions improved stiffness. None of working examples, in fact, actually provide a measure of physical properties, or compares any measured properties to measured properties of a film without the clay. The property characterizations appear only as a short, introductory characterization of the example membranes. This does not mean that only example 18 has improved mechanical properties; in fact, a number of examples (7, 8, 19-22) say nothing at all about film properties. Yet the films would be expected to have improved barrier and mechanical properties because the Mueller patent teaches throughout that they will.

Finally, the Examiner states, "Mueller discloses plastics such as polyolefins and ethylene vinyl alcohol (EVA [sic: EVA is the ethylene vinyl acetate copolymer, EVOH is ethylene vinyl alcohol copolymer] . . . . Plastics such as these are resilient at room temperature and are the same materials claimed by applicant (see instant claims 4 and 7). Applicants respectfully disagree. Polyolefins cannot be said as a class to be resilient, and the copolymer of ethylene and vinyl alcohol (or, for that matter, the copolymer of ethylene and vinyl acetate) is emphatically not resilient. Note Applicants' discussion of elastomers in paragraph 20 (page 7, beginning on line 20). The Examiner offers no support for his statement; none could possibly exist. Applicants respectfully direct the Board's attention once more to the definition of "resilience" from the *Engineering Materials Handbook* attached in the Evidence section of the Appeal Brief.

Moreover, as discussed above, one expects increased film stiffness based on the Mueller patent's discussions of physical properties, while the Bonk patent emphasizes the requirement

for elasticity. There can be no expectation of success, hence no obviousness, in the Examiner's proposed combination.

Thus, for these reasons, Appellants respectfully request this Honorable Board to REVERSE the rejection,

Conclusion

Because of the references do not provide any expectation of success, and lead one away from the claimed invention, Applicants respectfully petition this Honorable Board to reverse the final rejection of the claims on each ground and to indicate that all claims are allowable.

Respectfully submitted,

Anna M Budde

Anna M. Budde
Registration No. 35,085

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Harness, Dickey & Pierce, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600